Making use of chalk, instead of hard limestone, this cost would be greatly reduced.

A large number of manufacturing experiments, which I have conducted upon a small scale in the laboratory, have proved by practical demonstration that there can be made from materials at hand in this State, a Portland cement quite as good in quality as the imported article; and that this can be done in Kansas at an expense much less than in any other State in the Union, is equally well established.

ANALYSIS OF KANSAS SOILS.

By G. E. Patrick, Professor of Chemistry and Physics, in University of Kansas.

I have recently submitted to analysis samples of two soils from Wallace county, Kansas. As the results show them to be quite rich in certain elements of plant-food, and as no soils from that part of the state have heretofore been analyzed, it may not be out of place to submit a report of my analyses to the Academy.

Both samples were collected in September, 1875, by Mr. S. W. Williston, member of Professor Mudge's geological party. Neither of the plats from which they were taken has ever been cultivated.

Both samples were thoroughly air-dried, at ordinary temperature of the laboratory, before analysis.

SAMPLE NO. 1.

This was an upland soil, taken from the high prairie of Smoky Hill Valley, near Monument Rocks, Wallace county.

It yielded upon analysis:

Water		3.449
Organic matter		5.224
Soluble in cold hydrochloric acid..	Oxide of Iron	1.778
	Alumina	.721
	Lime	1.618
	Magnesia	2.084
	Potassa	.202
	Soda	.002
	Silicic acid	.023
	Sulphuric acid	.078
	Carbonic acid	2.567
	Phosphoric acid	.118
	Sodium chloride	.009
Insoluble in cold hydrochloric acid		82.127
		100.000

SAMPLE NO. 2.

This sample was taken from the upper loam of the Smoky Hill Valley bottom lands, thirty miles east of Fort Wallace, Wallace county.

It yielded upon analysis:

Water		1.895
Organic matter		3.039
Soluble in cold hydrochloric acid	Oxide of Iron	1.503
	Alumina	.557
	Lime	4.268
	Magnesia	.422
	Potassa	.214
	Soda	.038
	Silicic acid	.050
	Sulphuric acid	.041
	Carbonic acid	3.510
	Phosphoric acid	.173
	Sodium chloride	.003
Insoluble in cold hydrochloric acid		84.287
		100.000

One fact indicated by the above figures deserves special notice, namely, that of the alkaline bases present in the soluble portion of both these soils, potassa constitutes nearly the entire amount, while soda is found in but small quantity, especially in No. 1, where it is well nigh absent.

Considering that these soils have never been treated with fertilizers, the amount of phosphoric acid is almost exceptionally large.

The better to illustrate these points, and to facilitate general comparison, I have arranged these analyses, together with those of four other soils, in the following table. Nos. 1 and 2 are the Wallace county soils; No. 3 is from a plat in Wyandotte county, Kansas, that had been for eighteen years in blue-grass; No. 4 is an English clover soil, considered good; Nos. 5 and 6 are from Belmont county, Ohio, both upland; No. 5 a surface soil; No. 6 a subsoil.*

		Wallace county upland,	Wallace county bottom.	Wyandotte Co.	England	Belmont Co. Ohio, upland surface soil.	Belmont Co., Ohio, upland subsoil.
		No. 1.	No. 2.	No. 3.	No. 4,	No. 5.	No. 6.
Water		3.449	1.895	3.800	.....	2.260	2.220
Organic Matter		5.224	3.039	5.440	5.340	7.740	4.400
Soluble in hydrochloric acid	Oxide of Iron	1.778	1.503	2.575	6.070	8.327	6.810
	Alumina	.721	.557	4.325	4.510		
	Lime	1.618	4.268	.675	4.205	1.550	2.830
	Magnesia	2.084	.422	.063	1.270	2.333	3.343
	Potassa	.202	.214	.048	.520	.920	.027
	Soda	.002	.038	.125	.160		
	Silicic acid	.023	.050	.....	.....	.....	.....
	Sulphuric acid	.078	.041	.386	.196	2.340	2.820
	Carbonic acid	2.567	3.510	.....	3.305	.....	.....
	Phosphoric acid	.118	.173	.080	.150	.032	.087
	Sodium Chloride	.009	.003	.045	.080	.....	.....
Insoluble in hydrocloric acid		82.127	84.287	82.157	73.840	74.498	77.463
		100 000	100.000	99.719	99.590	100.000	106.000

* Nos. 3 and 4 are taken from the Report for 1874, of the Kansas State Board of Agriculture. Nos. 5 and 6 are from the Report of the U. S. Commissioner of Agriculture, for 1869.